REMARKS

Claims 10-11 are pending in the application. In the Office Action mailed December 17, 2009, claims 10-11 are rejected. In the instant Amendment, claims 10 and 11 have been amended.

Claim 10 has been amended to recite that the composition includes La, Ce, and Nd. Support for this amendment can be found throughout the specification, for example, at page 9, lines 8-9. Claim 10 has been further amended to recite the diameter of complex oxides, of $Ti_4C_2S_2$, of TiS and of fine carbides. Support for these amendments can be found at page 6, lines 12-28. Also, claim 10 has been amended to recite annealing at a temperature of 600 to 780 °C. Support can be found at page 12, lines 24-26 and at page 14, first line.

No new matter has been added by the amendment. Entry of the foregoing amendment and consideration of the following remarks are respectfully requested.

Rejection under 35 U.S.C. § 103

Claims 10 and 11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over JP 06-065647 ("the JP'647 publication") in view of JP 2003-268435 ("the JP'435 publication").

The amended claims are directed to an ultralow carbon cold-rolled annealed steel sheet containing La, Ce, and Nd which suppress the formation of fine TiS and fine carbides by fixing S as cerium oxysulfite, lanthanum oxysulfite, and neodymium oxysulfite and by forming $Ti_4C_2S_2$, all of which provide a larger grain size at a lower annealing temperature. Applicants have discovered that by adding La, Ce, and Nd, it is possible to enlarge the grain size of the precipitates and promote the crystal grain growth at a lower temperature of continuous annealing resulting in a steel sheet excellent in workability exhibiting a high r value and a high elongation value at a reduced energy cost by a single cold rolling operation and a single annealing operation. See, specification at page 6, ll. 24-35.

In contrast, the JP'647 publication requires two steps of cold rolling and annealing operations where the annealing temperatures of both the first and the second operations must be from 840 – 900 °C. JP'647 teaches that in order to obtain a high Rankford value, an annealing temperature of 840 °C or more is necessary. See, JP'647 at paragraph [0011]. Example 12, in Table 3, of JP'647 further demonstrate the criticality of

high annealing temperature in achieving a high r value by showing that lowering the final annealing temperature to 780 °C results in an inadequate r value of 1.9. Since the presently claimed steel is only subjected to a single step annealing at a temperature of 600 to 780 °C, a person skilled in the art, based on the teachings of JP'647, would not have expected that the claimed steel can achieve an r value of 2.0 or more.

Applicants respectfully direct the Examiner's attention to Sakai, 1968, J. Jpn. Soc. Tech. Plasticity, 9:108-115 (submitted in a Supplemental Information Disclosure Statement filed concurrently herewith; hereinafter "Sakai") for a discussion of the effects of annealing temperature on deep drawability. Reference Fig. 1 presented in the attached Exhibit A shows an overlay of the r value and annealing temperature data of steels of the presently claimed invention (diamonds) and steels of JP'647 (dark triangles) overlaid on Figure 2 of Sakai. In Sakai, VH steel is a low C steel having C 0.006%, R steel is a conventional steel having C 0.04% (see, Sakai Table 1). The data presented in Reference Fig. 1 clearly shows that the steels of JP'647 achieve high r values by using an annealing temperature of at least 840 °C, while the presently claimed steels achieve high r values at a much lower annealing temperature, e.g., 780 °C.

As discussed above, the reason that the presently claimed steel can achieve the recited r value of 2.0 or more at a lower annealing temperature is because the claimed steel contains La, Ce, and Nd which suppress the formation of fine TiS and fine carbides by fixing S as cerium oxysulfite, lanthanum oxysulfite, and neodymium oxysulfite and by forming $Ti_4C_2S_2$, all of which provide a larger grain size at a lower annealing temperature. JP'647 does not teach or suggest adding La, Ce, and Nd to suppress fine TiS and fine carbides, and fixing S as cerium oxysulfite, lanthanum oxysulfite, neodymium oxysulfite, and $Ti_4C_2S_2$. Thus, the presently claimed steel is not obvious over JP'647.

As previously discussed, the invention disclosed in the JP'435 publication relates to a low-carbon thin steel sheet where Ti of more than 0.005% is added to the molten steel containing a high amount of dissolved oxygen and forms solid phase TiOn system inclusions and Nd is added just enough for reductive decomposition which disperses fine Nd_2O_3 or TiO_n-Nd_2O_3 system inclusions into the molten steel for preventing surface damages of the cold rolled steel sheet by means of refining inclusions. See JP'435 at paragraph [0007]. JP'435 teaches casting, ingot casting and continuous casting. However, JP'435 does not teach or suggest an annealing step. JP'435 does not teach or suggest adding La, Ce, and

Nd to suppress fine TiS and fine carbides, and fixing S as cerium oxysulfite, lanthanum oxysulfite, neodymium oxysulfite, and $Ti_4C_2S_2$. Thus, JP'435 does not cure the deficiencies of JP'647.

Therefore, applicants respectfully submit that claims 10 and 11 are not obvious under 35 U.S.C. § 103(a) over the JP'647 publication and the JP'435 publication, either alone or in combination.

It is submitted that in view of the present amendment and foregoing remarks, the application is now in condition for allowance. It is therefore respectfully requested that the application, as amended, be allowed and passed for issue.

Respectfully submitted,

KENYON & KENYON LLP

By: _____
Weining Wang
Reg. No. 47,164

Dated: March 17, 2010

KENYON & KENYON LLP
One Broadway
New York, New York 10004
(212) 425-7200